high water
a floodplain management newsletter

Volume 33 September 1988

New developments in weather forecasting

Flash floods are among the most destructive types of flooding, responsible for one third of all flood-caused damage in the United States. During the 1970s, flash floods killed more people than any other storm-related phenomena, taking 200 lives a year. Most of the deaths occur because flash floods strike suddenly and unpredictably, spawned by severe local storms—"mesoscale events"—that are large enough to cause disasters, but too small to be accurately tracked by weather observers.

"Observations are so widely spaced that many local storms remain undetected," says Allen D. Pearson, former director of the National Severe Storms Forecast Center. "Even relatively large and severe thunderstorms are reported only sporadically and almost by chance." Such meoscale weather is hard to anticipate with traditional weather observation tools. Until recently, forecasting technology was stuck in the 1950s, with forecasters relying on outdated radar equipment, field checks of widely scattered rain and wind gauges, and a network of volunteer weather "spotters." This approach was slow, labor intensive, and accurate only in tracking the largest storm systems. In 1955, forecasts were accurate 40 percent of the time. Today, as new technologies are introduced, the accuracy rate is climbing to 95 percent.

This success stems from a combined effort by the National Oceanic and Atmospheric Administration, the National Weather Service (NWS), the Federal Aviation Administration, and the Defense

This towering cumulus cloud has the potential to develop into a storm cloud.

Department. Together they have designed and funded a nationwide system of automated atmospheric sensors, advanced radar, and computers with high-speed data links. Installation of 1,000 automated sensors began this year and will be completed by 1994. A network of 30 radar stations that can profile wind currents will be started in 1992 and the remainder should be in place by the year 2000. Using the wind profilers, forecasters will be able to monitor areas of convergence, divergence, and vorticity—hotspots for severe storm development. "There is little doubt that the technology in place by the year 2000 will provide the NWS with a much faster and

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more efficient means of disseminating weather information," says Elbert W. Friday, deputy director of NWS.

In addition to these automated monitoring stations, NWS is installing the advanced radar system NEXRAD to fill any gaps in the weather network. NEXRAD is a Doppler radar system, able to determine the size and location of a storm plus measure its intensity, wind speed and direction, and precipitation. These added capabilities enable forecasters to pinpoint a storm's location, predict whether it will intensify and how soon, and determine the rate of rainfall and how much rain has already fallen. NEXRAD can also spot storm cells before they fully develop. Dr. Kessler, a specialist in weather radar, notes that these capabilities are particularly helpful in forecasting flood conditions. NEXRAD, he says, "is ideal for looking between the weather stations at the mesoscale weather features that bring us many of the quick changes and sometimes violent extremes of local weather that most affect our lives."

The entire network will be linked by computer to NWS centers, providing up-to-the-minute information to meteorologists and forecasters. Storm warnings and watches can be issued earlier, with more confidence, and targeted to specific areas. The increased speed and accuracy of warnings will help emergency managers reduce loss of life and property. Evacuation times will be extended and unnecessary evacuations avoided.

All of this progress doesn't mean that the old ways have been abandoned. The volunteer spotter program continues to contribute valuable weather information to NWS. Some 120,000 spotters across the nation—primarily amateur radio operators, government employees, and meteorology clubs—regularly report visual sightings of severe weather. NWS has improved the training offered to spotters, teaching them the anatomy of storms and how to recognize early signs of storm development. A video is in the making to convey these new training concepts. NWS hopes to spark greater interest in the spotter program by providing more training opportunities.

For more information on the NWS spotter program, or on the national weather observation system, contact your local NWS field office or write to the National Weather Service, Gramax Building, 8060 13th Street, Silver Spring, MD 20910.

(This article was based on information from:

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Floodplain standards for detached garages or sheds

For floodplain management purposes, an appurtenant (accessory) structure, such as a detached garage or shed, need not be elevated or floodproofed above the base flood elevation as long as the structure is used solely for parking or storage of equipment used in connection with the dwelling. The Federal Emergency Management Agency (FEMA) feels that a detached garage or shed represents a minimal investment by the homeowner and that requiring the structure to be elevated or floodproofed would greatly increase the cost of such a structure. FEMA policy uses a "10 percent of dwelling value" figure as the threshold for inclusion of a detached garage or shed under a single policy. A newly placed detached garage or shed:

- cannot be used for human habitation
- must have low flood damage potential
- must have minimal resistance to flood flows
- must be adequately anchored
- must have the utilities elevated
- cannot violate floodway encroachment standards
- must be situated to least block flood flows

For flood insurance purposes, policy coverage for a single family dwelling includes a detached garage or shed that serves the described premises listed on the policy. The insurance rate is based on the lowest floor elevation of the dwelling structure located on the property.

If the garage or shed exceeds 10 percent of the dwelling's value, or is used for other than parking or storage, a separate policy needs to be purchased. A garage or shed that requires a separate flood insurance policy and is built after the date on the Flood Insurance Rate Map will be rated actuarially. If the garage or shed is not elevated, the premium costs will be high.

Boathouses are written under separate policies because they are not considered an appurtenant structure.

Insurance to pay before structure collapses

On December 22, 1987, Congress passed the Housing and Community Development Act of 1987. Section 544 of this bill contains an amendment to the National Flood Insurance Act of 1968 that provides for advance flood insurance payments for structures subject to "imminent collapse" from erosion. This is a significant change—prior policy was to pay flood insurance claims only after damage occurred. The amendment states that any structure covered by flood insurance and located on land on the shore of a body of water, which is **certified** by an appropriate state or local land use authority to be subject to "imminent collapse or subsidence as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels," will be eligible for claims payment under the Standard Flood Insurance Policy as follows:

a. for demolition—the value of the structue or the amount of insurance coverage in place, whichever is less, plus up to 10 percent of the demolition cost;

b. for relocation—up to 40 percent of the value of the structure, not to exceed the actual cost of the move;

c. if no effort is made to demolish or relocate and the structure collapses, payment is limited to 40 percent.

Relocation or reconstruction must meet the provision that requires buildings to be set back according to the 30-to 60-year

standards determined by the size of the building. These erosion setback provisions have not been developed to date.

Structures are not eligible for these payments unless covered by a flood insurance policy:

- on or before June 1, 1988;
- for a period of two years prior to certification of imminent collapse; or
- for the term of ownership if less than two years.

This amendment will help promote the removal of floodplain structures from shorelines and erosion hazards before they create additional problems.

The Federal Emergency Management Agency has not determined the rules on how to implement this amendment. Interim rules will be developed by the National Flood Insurance Program.

Flooding still a reality in drought year

This year the possibility of a flood seems remote, and as dry as it's been a flood may even seem welcome. But even in drought years destructive flooding is still a possibility. Heavy rainstorms can occur anytime in the spring, summer, or fall. Dry conditions can actually contribute to the damage caused by a heavy rainstorm. When the soil is baked hard by a drought and vegetation is scarce, the ground cannot absorb heavy rainfall. Runoff occurs more rapidly than usual and may lead to flash flooding.

In May this year flash flooding did occur in eastern Carbon County. On May 7 and 8, four to six inches of rain fell causing creeks to overflow their banks. The town of Roberts was sandbagged at the south end to keep water from flooding homes. Bill King, Disaster and Emergency Services Coordinator for Carbon County, said "we really got to put our training to work. A year and a half ago, we had a course on sandbagging. It sounds like a little thing, but it becomes invaluable when you have a disaster like this."

Several culverts and a bridge were washed out. The wind was blowing so hard it forced water under doors and through cracks in buildings in Bridger. Basements in the area, including one in the Roberts School, were flooded.

May flooding in Carbon County washed out this road crossing. Photo courtesy of Larry Mayer, Billings Gazette.

That rain storm evaporated the fear of drought in the area. The storm pushed Red Lodge's cumulative precipitation for the spring to 192 percent of normal according to the Montana Crop and Livestock Reporting Service.

Flash flooding in our region has also occurred in late summer and fall. On August 1, 1985, Cheyenne, Wyoming received 6.06 inches of rain, over half of it in a one-hour period. Twelve people died in the resultant flooding.

In September of 1986, heavy rainstorms inundated the Hi-Line, dumping eight inches of rain in some areas. Flash flooding resulted on the small tributaries of the Milk River in a 100-mile stretch from Chinook to Saco. Malta, Chinook, and Harlem were hardest hit.

Earlier in 1986, February saw flooding in several areas of Montana. This flooding was caused by rapid melting of heavy snow. The Conrad area was most affected and one man was drowned.

1988 is turning out to be one of the driest years since the 1930s, and newspapers are full of drought headlines. But that doesn't mean we can disregard the threat of flooding. For example, 1981 started out dry with little sign of improving. Late May of that year, the Governor's Drought Task Force met to discuss the drought emergency. That June the task force had to meet about another emergency—flooding.

New floodplain management guidebook available soon

We are revising the 1982 edition of our guidebook. The 1988 publication should be available in September. Copies will be sent to communities that have adopted floodplain management regulations.

The guidebook contains information on the National Flood Insurance Program, floodplain and floodway management standards, a review of the model floodplain ordinance, and an outline of the floodplain permit process and administrative procedures. The appendices include helpful information on how to read floodplain maps and flood profiles, an explanation of the floodway, and a permit guide for water related projects.

New floodplain administrators will find the guidebook a valuable training tool. For administrators currently working with floodplain regulations, the guidebook can help clear up any questions about standards not fully covered in their local ordinance. There are also diagrams illustrating structure elevation, floodproofing, mobile home anchoring, and determining lowest floor for elevation purposes.

One copy of the guidebook will be distributed to each floodplain administrator. If you would like extra copies please let us know.

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Funding for this newsletter was provided by the Federal Emergency Management Agency. Statements contained in it are the responsibility of the Floodplain Management Section of the Department of Natural Resources and Conservation.